

REMARKS

Claims 1-4, 7-12, 14, and 18-26 are all the claims presently pending in the application. Claims 7 and 9 are amended to more clearly define the invention and claims 21-26 are added. Claims 10-14 are withdrawn from prosecution. Of the remaining claims, claims 1 and 20 are independent.

These amendments are made only to more particularly point out the invention for the Examiner and not for narrowing the scope of the claims or for any reason related to a statutory requirement for patentability.

Applicants also note that, notwithstanding any claim amendments herein or later during prosecution, Applicants' intent is to encompass equivalents of all claim elements.

Claims 1-5, 9, and 18-20 stand rejected under 35 U.S.C. § 102(b) as being anticipated by the Hopkins reference. Claims 7 and 8 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Hopkins reference.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

An exemplary embodiment of the claimed invention, as defined by, for example, independent claim 1, is directed to a cross shaft joint tiltably coupling two shaft members to each other. The cross shaft joint includes a cross shaft which includes four shaft portions and is arranged between the two shaft members, outer ring cups rotatably provided to the four shaft portions, respectively, at least one of the outer ring cups with a key portion extending in a radial direction corresponding to a key groove in one of the two shaft members; and an attachment hole extending from an inner end of the key portion in a radial direction.

Some conventional cross-shaft joints, like the joint that is disclosed by the Hopkins reference, have no means with which the joint may be balanced. Such joints suffer from vibrations which apply adverse forces to the mounts and/or bearings. Further, the inability to balance results in a power being diverted into the reciprocating shaking motions which decreases the efficiency of power transmission.

Conventional cross-shaft joints have been developed which address the imbalance problems that are exhibited by, for example, the joint that is disclosed by the Hopkins reference. These cross shaft joints provide a means for balancing the joint.

These conventional, balance-able, cross shaft joints have outer ring cups that are

directly fixed to the corresponding shafts. These outer ring cups are generally forged. These outer ring cups are typically attached to the shaft members by the manufacturer and the assembly is balanced by attaching a balance piece to the shaft members using a balance machine.

In this manner, these cross-shaft joints are able to solve the imbalance problems experienced by joints, such as the joint disclosed by the Hopkins reference.

However, when a customer exchanges parts within the cross shaft joint, the balance is lost and must again be obtained. However, customers do not generally have the balance machine that the manufacturer used to obtain a balance. Thus, the customers are not capable of balancing a cross shaft joint.

In stark contrast, the present invention provides a cross shaft joint in which an outer ring cups includes a key portion extending in a radial direction with an attachment hole extending from an inner end of the key portion in a radial direction. In this manner, the customer may balance the cross shaft joint without having a balance machine (page 7, line 24 - page 8, line 4). Further, a centrifugal force acts to press the balance weight into the attachment hole (page 8, lines 21 - 25).

II. THE PRIOR ART REJECTIONS

The Examiner alleges that the Hopkins reference teaches the invention recited by claims 1-5, 9, and 18-20 and further alleges that one of ordinary skill in the art would have been motivated to modify the teachings of the Hopkins reference to form the invention recited by claims 7 and 8. Applicant submits, however, that there are elements of the claimed invention which are neither taught nor suggested by the Hopkins reference and that one of ordinary skill in the art at the time the invention was made would not have modified the teachings of the Hopkins reference as alleged by the Examiner.

The Hopkins reference does not teach or suggest the features of the claimed invention including, among other things: 1) a key portion extending in a radial direction (claims 1 and 20); 2) an attachment hole extending in a radial direction (claims 1 and 20); 3) a balance weight fixed with a plug into the attachment hole (claim 3); 4) a balance weight attached to the key portion (claim 4); 5) a balance weight in the attachment hole (claims 9 and 18); 6) a bottom of the attachment hole is narrower than an intermediate portion of the attachment hole (claims 23 and 25); and 7) a bottom of the attachment hole is closed (claims 24 and 26). In

this manner, the present invention provides the ability to balance the joint, to extend the life of the joint and improving the power transmission efficiency by reducing the vibrations. Further, the present invention provides the ability to balance the joint without requiring a balance machine. Additionally, the present invention takes advantage of the centrifugal forces applied to the balance weight to aid in maintaining the balance weight within the attachment hole.

In stark contrast, the joint that is disclosed by the Hopkins reference does not teach or suggest any means for balancing the joint at all, let alone a key portion extending in a radial direction, an attachment hole extending in a radial direction, a balance weight fixed with a plug into the attachment hole, a balance weight attached to the key portion, or a balance weight in the attachment hole.

The Examiner attempts to allege that the bolts 44 which attach the mating arms 29 and 30 to the respective shafts 14 and 15 correspond to balance weights. Such an allegation stretches the interpretation of the claim language well beyond the broadest reasonable interpretation.

**“CLAIMS MUST BE GIVEN THEIR BROADEST
REASONABLE INTERPRETATION”**

“During patent examination, the pending claims must be ‘given their broadest reasonable interpretation consistent with the specification.’”

“The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach.”
(M.P.E.P. 2111).

**“THE WORDS OF A CLAIM MUST BE GIVEN THEIR
‘PLAIN MEANING’ UNLESS THEY ARE DEFINED IN THE
SPECIFICATION”**

“This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. . . . Ordinary, simple English words whose meaning is clear and unquestionable, absent any indication that their use in a particular context changes their meaning, are construed to mean exactly what they say.” (M.P.E.P. 2111.01(I)).

**“‘PLAIN MEANING’ REFERS TO THE ORDINARY AND
CUSTOMARY MEANING GIVEN TO THE TERM BY THOSE OF
ORDINARY SKILL IN THE ART”**

“[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention. . . . In the absence of an express intent to impart a novel meaning to the claim terms, the words are presumed to take on the ordinary and customary meaning attributed to them by those of ordinary skill in the art. It is the use of the words in the context of the written description and customarily by those skilled in the relevant art that accurately reflects both the ‘ordinary’ and ‘customary’ meaning of those terms in the claims.” (M.P.E.P. 2111.01(II)).

In the present instance, and in view of the context of the present specification, the plain meaning of the term “balance weight” as understood by those of ordinary skill in the art is a weight which is used to balance a joint. Those of ordinary skill in the art of the relevant art understand that a balance weight is used to adjust the weight of joint to reduce and/or eliminate rotational vibrations in the joint.

The Examiner’s allegation that the bolts 44 of the joint that is disclosed by the Hopkins reference corresponds to the claimed balance weight extends the interpretation of the claim language well beyond the broadest reasonable interpretation and, certainly, well beyond the ordinary and customary meaning given to that term by those of ordinary skill in the art.

The Hopkins reference explains that the bolts 44 “connect the body plates 31 of the two members 29 and 30 [and] act also to hold the terminals of the shafts 13 or 14, as the case may be, against rotation in the receiving channel or socket formed by the two plates 31.” (page 2, lines 55-61). In other words, the bolts 44 of the Hopkins reference serve to hold the mating arms 29 and 30 together and to maintain the mating arms 29 and 30 in place on the end of a corresponding shaft end 13 or 14. The bolts 44 do not balance the joint at all.

Clearly, the Hopkins reference does not teach or suggest any balance weight at all.

Further, the Hopkins reference does not teach or suggest a key portion extending in a radial direction as recited by claims 1 and 20.

The Examiner alleges that the “edge portions” at page 2, line 66 of the Hopkins

reference corresponds to the claimed key portion. These “edge portions” receive apertures 37 which extend from the edge portions and which extend to interiorly located grooves 38. These “edge portions” certainly do not serve as key portions and, therefore, the allegation that the “edge portions” correspond to the claimed key portion stretches the interpretation of the claimed language well beyond any reasonable interpretation and well beyond the plain meaning of key portion as understood by those of ordinary skill in the relevant art.

Moreover, the edge portions clearly do not extend in a radial direction as recited by independent claims 1 and 20. Rather, the edge portions that are disclosed by the joint of the Hopkins reference extend in a circumferential direction, and not in a radial direction.

Similarly, contrary to the Examiner’s allegation, the spaced apertures 37 do not correspond to an attachment hole that extends in a radial direction. Rather, the spaced apertures 37 very clearly extend in a circumferential direction, not a radial direction.

As explained before, the holes in the outer ring cups extend in a radial direction so that the centrifugal forces on a balance weight serves to hold the balance weight in the hole, since the centrifugal forces act in a radial direction.

Clearly, the centrifugal forces which would act on the bolts 44 do not serve to hold the bolts 44 in the spaced grooves 39 or the spaced apertures 37 at all.

The Hopkins reference does not teach or suggest the features of the claimed invention including, among other things: 1) a key portion extending in a radial direction (claims 1 and 20); 2) an attachment hole extending in a radial direction (claims 1 and 20); 3) a balance weight fixed with a plug into the attachment hole (claim 3); 4) a balance weight attached to the key portion (claim 4); 5) a balance weight in the attachment hole (claims 9 and 18); 6) a bottom of the attachment hole is narrower than an intermediate portion of the attachment hole (claims 23 and 25); and 7) a bottom of the attachment hole is closed (claims 24 and 26).

Therefore, the Examiner is respectfully requested to withdraw these rejections of claims 1-5, 7-9, and 18-20.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing amendments and remarks, Applicants respectfully submit that claims 1-4, 7-12, 14, and 18-26, all the claims presently pending in the Application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.


Should the Examiner find the Application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: _____

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